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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,755	08/09/2006	Yoshiaki Sonobe	M4782	6031

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WESTERN DIGITAL CORPORATION
ATTN: LESLEY NING / IP LAW DEPARTMENT
3355 MICHELSON DRIVE, SUITE 100
IRVINE, CA 92612

EXAMINER	
HARRIS, GARY D	

ART UNIT	PAPER NUMBER
1785	

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01/04/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,755	SONOBE ET AL.	
	Examiner	Art Unit	
	GARY D. HARRIS	1785	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5,6,11 and 12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,6,11 and 12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Usuki et al. JP 2003-272121 (published 9/26/2003.)

As to Claim 1, Usuki discloses a perpendicular magnetic recording disk for use in perpendicular magnetic recording (see abstract). The perpendicular magnetic recording disk includes a substrate (Paragraph 4), a soft magnetic layer of a material selected from a group consisting of an Fe-based material and a Co-based material on said substrate (Paragraph 31 & 52, Permalloy and/or amorphous, Paragraph 14 & 50). A magnetic recording layer is on the soft magnetic layer (see figure 1). The ferromagnetic layer on the soft magnetic layer has a granular structure (non-magnetic metal oxide), and includes crystal grains mainly made of cobalt (Co) (Paragraph 7). The grain boundary portions are mainly made of SiO2 (Paragraph 15). A layer on the ferromagnetic layer does not have a granular structure and is from a CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3 (Paragraph 12 & 13). The content of the SiO2 in the

granular ferromagnetic layer is 6at% or more (Paragraph 16). The perpendicular magnetic recording disk is on a substrate followed by a soft magnetic layer (Paragraph 31), a ferromagnetic layer having the granular structure, and then a layer having no granular structure (Paragraph 8).

As to Claim 5, Usuki discloses perpendicular magnetic recording disk using a spacer layer (foundation layer) selected from a Pd and Pt between the ferromagnetic layer and the layer having no granular structure (Paragraph 29). The layer having no granular structure is a CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3 (Paragraph 3, 4 & 10).

As to Claim 11, Usuki discloses a perpendicular magnetic recording disk with an underlayer and a Ru layer provided between the soft magnetic layer and the ferromagnetic layer (Paragraph 50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Usuki et al. JP 2003-272121.

As to Claim 6, Usuki discloses a method of manufacturing a perpendicular magnetic recording disk for use in perpendicular magnetic recording (see abstract). The disk includes a soft magnetic layer of a material selected from a group consisting of an Fe-based material and a Co-based material on a substrate (Paragraph 31 & 52, Permalloy). A magnetic recording layer is on the soft magnetic layer (Paragraph 12 & 13). The method includes a step of forming magnetic recording layer comprising, on the soft magnetic layer (Paragraph 18, 22). A ferromagnetic layer is made of a granular structure comprising SiO2 between crystal grains comprising cobalt (Co) (Paragraph 27). The SiO2 content in the ferromagnetic layer is 6at% or more (Paragraph 16). A layer on the ferromagnetic layer does not have a granular structure and includes a CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3 (Paragraph 12 & 13). Forming the ferromagnetic layer on the soft magnetic layer is done by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The process continues with forming a layer having no granular structure with a CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3 by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The method of manufacturing the perpendicular magnetic recording disk is on a substrate followed by a soft magnetic layer (Paragraph 31), a ferromagnetic layer

having the granular structure, and then a layer having a magnetic layer with no granular structure (Paragraph 8).

Usuki is silent with regard to the sputtering gas pressure lower than the gas pressure when forming the ferromagnetic layer.

However, Usuki discloses the anisotropy magnetization and the orientation of the magnetic layers can be adjusted with the argon pressure (Paragraph 14). Additionally, the forming temperature was adjusted in the Usuki invention to improve the coercive force (Paragraph 77) and the use of vacuum deposition and the sputtering using direct current (DC) sputtering methods in an argon environment or with a small amount of oxygen introduced to adjust the non-magnetic metal oxide content (Paragraph 18).

It would have been obvious to one skilled in the art to lower the gas pressure when forming the ferromagnetic layer in order to change the anisotropy magnetization as taught by Usuki. One would have been motivated to change the conditions of the sputtering environment in order to change the magnetic orientation. One of ordinary skill would have recognized that changing the pressure, temperature, voltage, current, gas, and flow rate in a sputtering environment would result in a change in the magnetic properties in a magnetic recording medium.

As to Claim 12, Usuki discloses a method of manufacturing a perpendicular magnetic recording disk for use in perpendicular magnetic recording and having at least a soft magnetic layer of a material selected from a group consisting of an Fe-based

material and a Co-based material on a substrate(Paragraph 31 & 52, Permalloy). An underlayer including Ru on said soft magnetic layer (Paragraph 50).

The method includes a step of forming magnetic recording layer comprising, on the soft magnetic layer (Paragraph 18, 22). A ferromagnetic layer is made of a granular structure comprising SiO2 between crystal grains comprising cobalt (Co) (Paragraph 27). The SiO2 content in the ferromagnetic layer is 6at% or more (Paragraph 16). A layer produced on the ferromagnetic layer that does not have a granular structure includes a CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3 (Paragraph 12 & 13). Forming the ferromagnetic layer on the soft magnetic layer is done by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The process continues where forming the layer having no granular structure with a CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3 by sputtering in an argon gas atmosphere (Paragraph 14, 18, 22, 61, 66-67 & 79). The method of manufacturing the perpendicular magnetic recording disk is on a substrate followed by a soft magnetic layer (Paragraph 31), a ferromagnetic layer having the granular structure, and then a layer having a magnetic layer with no granular structure (Paragraph 8).

Usuki is silent with regard to the sputtering gas pressure lower than the gas pressure when forming the ferromagnetic layer.

However, Usuki discloses the anisotropy magnetization and the orientation of the magnetic layers can be adjusted with the argon pressure (Paragraph 14). Additionally, the forming temperature was adjusted in the Usuki invention to improve the coercive

force (Paragraph 77) and the use of vacuum deposition and the sputtering using DC sputtering methods an argon environment or with a small amount of oxygen introduced to adjust the non-magnetic metal oxide content (Paragraph 18).

It would have been obvious to one skilled in the art to lower the gas pressure when forming the ferromagnetic layer in order to change the anisotropy magnetization as taught by Usuki. One would have been motivated to change the conditions of the sputtering environment in order to change the magnetic orientation. One of ordinary skill would have recognized that changing the pressure, temperature, voltage, current, gas, and flow rate in a sputtering environment would result in a change in the magnetic properties in a magnetic recording medium.

Restriction

Claim 6 & 12 are directed to a method of forming, a restriction has not been made between the method and article claims as no substantive limitations have been presented at this time. The examiner notes if applicant amends method claims and adds substantive method limits, a restriction may be required at that time.

Response to Arguments

Applicant's arguments filed on 10/25/2010 (in italics) are addressed as follows:

Usuki discloses a magnetic recording medium comprising a ferromagnetic metal alloy which contains cobalt in at least one field of a base material wherein the first magnetic layer that comprised a non-magnetic metal oxide and the second magnetic layer that consists of a rare earth transition metal are stacked in this order. See paragraph [0007].

In addition, Usuki discloses that the mixing ratio of the ferromagnetic metal alloy and the non-magnetic metal oxide is in the range of 95:5 - 80-20 (metal atom ratio). See paragraph [0012]. In other words, Usuki discloses that the amount of Si02 present in ferromagnetic layer is a function of the number of metal atoms present in the layer.

In contrast, according to the present invention, the amount of SiO2 present in the ferromagnetic layer is a function of the total atoms present, both metal and non-metal. Thus, in Usuki, there is no description that the ferromagnetic layer contains SiO2 in an amount based on the total number of atoms in the layer. Claims 5 and 11 should also be allowable due to their dependency from Claim 1.

Claims 6 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Usuki et al (JP 2003-272121, hereinafter "Usuki"). This rejection is traversed for at least the following reasons.

Turning next to the rejection of Claims 6 and 12, the rejection should be withdrawn because there is no suggestion, either from the description in the prior art or from the knowledge of an artisan, to provide a ferromagnetic layer having the amount of SiO2 present in the ferromagnetic layer is a function of the total atoms present, metal and non-metal, as claimed.

Applicant argues that Usuki is measuring metal atoms and not the total atoms present. However, applicant's specification does not teach or otherwise mention that it is not the at% metal atoms present. The claim requires the SiO2 to be 6at% or more. Usuki discloses the ratio of ferromagnetic alloy:non-magnetic metal oxide is in the range of 95:5 – 80:20 (metal atom ratio) which encompasses applicants claim (based on 100 atoms present) [0016].

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY D. HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1785

/G. D. H./Gary Harris
Examiner, Art Unit 1785